

Advantech AE Technical Sharing Document

Date	2020 / 3 / 23	Release Note	<input type="checkbox"/> Internal <input checked="" type="checkbox"/> External
Category	<input checked="" type="checkbox"/> FAQ <input type="checkbox"/> SOP	Related OS	Linux
Abstract	PCM-24S2WF-BE cannot work at 5GHz frequency in Linux.		
Keyword	PCM-24S2WF-BE, Linux.		
Related Product	PCM-24S2WF-BE		

■ **Problem Description:**

PCM-24S2WF-BE equips controller “QCA6174” from Qualcomm.

It supports WIFI connection at two frequencies, 2.4GHz and 5GHz.

Customer feedback that 5GHz doesn’t work in CentOS7 with Linux kernel 3.10.0.

The frequency list shows that there is no 5GHz available for this module.

```
* 54.0 Mbps
Frequencies:
* 5180 MHz [36] (30.0 dBm) (no IR)
* 5200 MHz [40] (30.0 dBm) (no IR)
* 5220 MHz [44] (30.0 dBm) (no IR)
* 5240 MHz [48] (30.0 dBm) (no IR)
* 5260 MHz [52] (30.0 dBm) (no IR, radar detection)
* 5280 MHz [56] (30.0 dBm) (no IR, radar detection)
* 5300 MHz [60] (30.0 dBm) (no IR, radar detection)
* 5320 MHz [64] (30.0 dBm) (no IR, radar detection)
* 5500 MHz [100] (30.0 dBm) (no IR, radar detection)
* 5520 MHz [104] (30.0 dBm) (no IR, radar detection)
* 5540 MHz [108] (30.0 dBm) (no IR, radar detection)
* 5560 MHz [112] (30.0 dBm) (no IR, radar detection)
* 5580 MHz [116] (30.0 dBm) (no IR, radar detection)
* 5600 MHz [120] (30.0 dBm) (no IR, radar detection)
* 5620 MHz [124] (30.0 dBm) (no IR, radar detection)
* 5640 MHz [128] (30.0 dBm) (no IR, radar detection)
* 5660 MHz [132] (30.0 dBm) (no IR, radar detection)
* 5680 MHz [136] (30.0 dBm) (no IR, radar detection)
* 5700 MHz [140] (30.0 dBm) (no IR, radar detection)
* 5720 MHz [144] (30.0 dBm) (no IR)
* 5745 MHz [149] (30.0 dBm) (no IR)
* 5765 MHz [153] (30.0 dBm) (no IR)
* 5785 MHz [157] (30.0 dBm) (no IR)
* 5805 MHz [161] (30.0 dBm) (no IR)
* 5825 MHz [165] (30.0 dBm) (no IR)
* 5845 MHz [169] (30.0 dBm) (no IR)
* 5865 MHz [173] (disabled)
Supported commands:
```

Customer tried to install driver with version 4.4.1.c2 but the problem still exists.

```
[root@advantech dlr]# ethtool -i wlp2s0
driver: ath10k_pci
version: 4.18.0-147.5.1.el8_1.x86_64
firmware-version: RM.4.4.1.c2-00057-QCARMSWP-1
expansion-rom-version:
bus-info: 0000:02:00.0
supports-statistics: yes
supports-test: no
supports-EEPROM-access: no
supports-register-dump: no
supports-priv-flags: no
```

■ **Brief Analysis and Solution :**

First of all, the driver “ath10k” only supports kernel later than version 4.0.

Please firstly update your OS kernel to make it supportable.

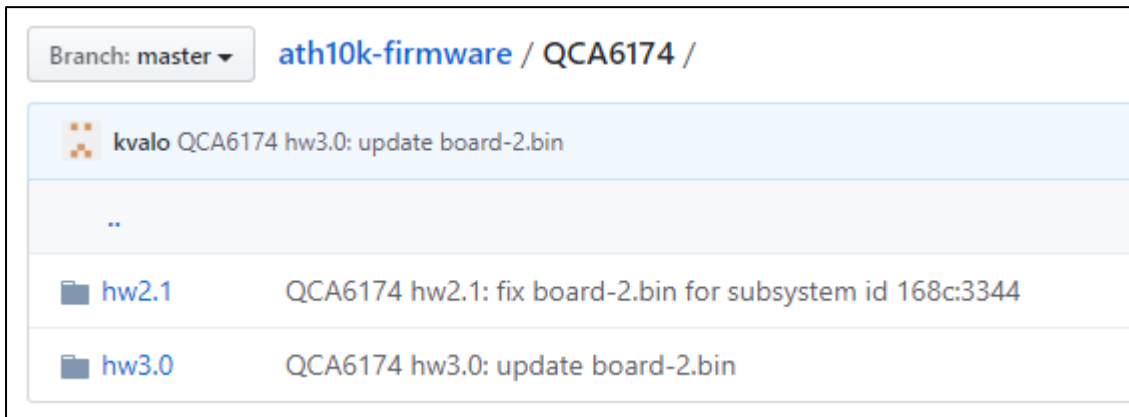
ath10k firmware

The ath10k firmware images are available from [linux-firmware.git](https://github.com/linux-firmware/linux-firmware.git) which all common Linux distributions should install by default. Latest firmware images can be downloaded from [ath10k-firmware.git](https://github.com/linux-firmware/ath10k-firmware.git) from which they get eventually pushed to [linux-firmware.git](https://github.com/linux-firmware/linux-firmware.git).

Firmware branches

Hardware	Firmware major version/branch	Latest firmware revision	Intended use	Kernel version required*
QCA988X	main	link	STA	3.11
QCA988X	10.1	link	AP	3.13
QCA988X	10.2	link	AP	3.18
QCA988X	10.2.4	link	AP	4.0
QCA6164/QCA6174	wmi-tlv	link	AP/STA	4.0
QCA9980	10.4	link	AP	4.2

Second, download the latest firmware of QCA6174 from <https://wireless.wiki.kernel.org/en/users/drivers/ath10k/firmware>. Driver contains both “hw2.1” and “hw3.0”.



The firmware “hw2.1” and “hw3.0” should all be renewed by following instruction.

Update firmware

First download the firmware image from the links above. In this example we use firmware-2.bin_10.1.467.2-1 from QCA988X 10.1 directory. Then just copy that file as firmware-2.bin to the ath10k firmware directory:

```
cp firmware-2.bin_10.1.467.2-1 /lib/firmware/ath10k/QCA988X/hw2.0/firmware-2.bin
```

Then reload ath10k (or restart the system) and you can **check if the new firmware is in use**.

Note: In some distributions the firmware location can be different than /lib/firmware.

The latest version we got was 4.4.1.c3 as shown in figure.

It is tested that the module works in 5GHz frequency with the firmware version 4.4.1.c3.

```
[root@localhost gg]# ethtool -i wlp2s0
driver: ath10k_pci
version: 4.18.0-147.5.1.el8_1.x86_64
firmware-version: RM.4.4.1.c3-00013-QCARMSWPZ-1
expansion-rom-version:
bus-info: 0000:02:00.0
supports-statistics: yes
supports-test: no
supports-eeprom-access: no
supports-register-dump: no
supports-priv-flags: no
[root@localhost gg]#
```

We could check that the WIFI connection is established at channel 149 from figure below.

```

* 48.0 Mbps
* 54.0 Mbps
Frequencies:
* 5180 MHz [36] (30.0 dBm) (no IR)
* 5200 MHz [40] (30.0 dBm) (no IR)
* 5220 MHz [44] (30.0 dBm) (no IR)
* 5240 MHz [48] (30.0 dBm) (no IR)
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* 5720 MHz [144] (30.0 dBm) (no IR)
* 5745 MHz [149] (30.0 dBm)
* 5765 MHz [153] (30.0 dBm)
* 5785 MHz [157] (30.0 dBm) (no IR)
* 5805 MHz [161] (30.0 dBm) (no IR)
* 5825 MHz [165] (30.0 dBm) (no IR)

```

```

Airplane Mode
gg@localhost:/h
File Edit View Search Terminal Help
[root@localhost gg]# nmcli d wifi list
IN-USE SSID MODE CHAN RAT
yu's home Infra 149 270
WISE PaaS IIoT 3.0 Infra 133 270
dlinkSAE Infra 2 270
Xiaomi CA39 Infra 6 130
Advantecher-Mobile Infra 60 270
WiFi Phone Infra 60 270
Cell Phone Infra 60 270
lines 1-8/8 (END)

```

Here is the frequency list from Ubuntu18.04.
It ideally supports both 2.4GHz and 5GHz.

```

Restore Session - Mozilla Firefox
root@advantech-Default-string: /home/advantech
File Edit View Search Terminal Help
[interface] wpakeys
[interface] genie
[interface] modulation
root@advantech-Default-string:/home/advantech# iwlist frequency
lo no frequency information.
wlp3s0 32 channels in total; available frequencies :
Channel 01 : 2.412 GHz
Channel 02 : 2.417 GHz
Channel 03 : 2.422 GHz
Channel 04 : 2.427 GHz
Channel 05 : 2.432 GHz
Channel 06 : 2.437 GHz
Channel 07 : 2.442 GHz
Channel 08 : 2.447 GHz
Channel 09 : 2.452 GHz
Channel 10 : 2.457 GHz
Channel 11 : 2.462 GHz
Channel 12 : 2.467 GHz
Channel 13 : 2.472 GHz
Channel 36 : 5.18 GHz
Channel 40 : 5.2 GHz
Channel 44 : 5.22 GHz
Channel 48 : 5.24 GHz
Channel 52 : 5.26 GHz
Channel 56 : 5.28 GHz
Channel 60 : 5.3 GHz
Channel 64 : 5.32 GHz
Channel 100 : 5.5 GHz
Channel 104 : 5.52 GHz
Channel 108 : 5.54 GHz
Channel 112 : 5.56 GHz
Channel 116 : 5.58 GHz
Channel 120 : 5.6 GHz
Channel 124 : 5.62 GHz
Channel 128 : 5.64 GHz
Channel 132 : 5.66 GHz
Channel 136 : 5.68 GHz
Channel 140 : 5.7 GHz
enp2s0 no frequency information.
enp1s0 no frequency information.
root@advantech-Default-string:/home/advantech#

```

■ **Contact Window:**

If you need further information from headquarter, please contact ACL PAE team.

Region (after service)	Product AE	Backup
America	Edison Hsiung	Tony Cheng
Europe	Tony Cheng	Edison Hsiung
ATW / ACN / AKR	Simon Peng	Jerry Cheng
AJP / Inter-con, etc.....	Jerry Cheng	Simon Peng